

Designing a RDBMS for Storing and Managing the Usage of Photovoltaic Panels: Albanian Case

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Abstract

In everyday life the production and broadcast of material goods, computer and management in global communication cannot be realized without an electrical power source, the output of which is associated with environmental and safety problems. Current methods for providing electricity departing from limited natural resources, such as oil, gas, coal, etc. Simultaneously every day we face not only with the increasing prices for them, but also the problem of environmental pollution, which brings their burning. Fortunately there is a solution, and it is the use of renewable energy sources, such as biomass, solar energy, wind power, etc. Because of the benefits obtained from their use on dozens of regions in the world are directed to the use of these resources, especially solar energy. This energy is collected through solar panels and back into thermal or electric energy. Systems that convert the energy of sunlight into electricity are called photovoltaic systems. In this paper we will focus on the structuring of data collection about technologies and parameters to use photovoltaic systems in Albania. In order that these data collected be managed with high efficiency, it is appropriate that they are stored in a DB. DB Design brings genuine analysis of the current situation, but the future forecast for our country can be done on its basis. So on the basis of the studying of the DB, can be judge the economic and ecological benefits that come from the use of solar energy. The consumer can judge the energy efficiency, technology used, methods of installation, etc. Responsible institutions can deal with completing the updates of data for the completion of a DB at the national level.

Keywords: *renewable resources, database, solar energy, electricity, photovoltaic panels.*

1. Introduction

The need for electricity in everyday life on the one hand and the rising cost of electricity, but not only, in turn, necessitates the use of renewable energy. Use of renewable energy resources brings economic development, environmental protection, creation of new jobs, the decentralization of energy resources, etc. So on one hand are the natural resources that are normally reducing, and the other hand the use of solar energy, that on the whole, brings technological innovation and infrastructure investments in the future. Regarding the use of solar energy in our country conditions must rely on two links:

- ▮ use solar panels cost as low
- ▮ use of solar panels as high performance

Vision of solar energy at a low cost relies on the use of PV equipment and SHS in connection with the AC network.

Vision for high technology refers to "Future Vision 2030" by the European Solar Technology Platform, according to which the facades and roofs should be adjusted as solar thermal collectors and PV modules for power generation, as well as transparent for heat insulation of walls, as for e.g... As insulation with vacuum. The combination of solar elements leads to the possibility of a complete solar solution. (Solar Thermal Vision 2030 ESTTP, 2006). So today can be used a full solar technology.

In order to create the possibility of using solar panels in as a low cost as possible and as higher efficiency as possible, have made the study of their production technologies, the manner of installation of the panels in accordance with the geographical position, etc. And for the data collection and its processing is required a DB. DB are specialized structures that allow computer systems to preserve, manage and refined the Data at a high speed.

2. Background

The EU has set concrete targets for the use of RES (renewable energy sources) by the Member States given the current state of renewable energy as well as their economic development. In terms of Albania, the objective related to RES set by the Council of Ministers for the period 2009-2020 based on the international commitments of the RA to the International Convention of the United Nations Climate Change, Kyoto Protocol and the Energy Community Treaty. In terms of our country it is thought to reach the target on the use of RES around 37% for 2020. In meeting national needs hydro, biomass and solar energy will play a significant role.

Does Albania have obligations? "Albania has ratified the Kyoto Protocol, but has no liability in amount and time to reduce the emission of greenhouse gases. But Albania should take voluntary commitments, as not only developed countries that have historical responsibility for global warming and climate change, but also countries like Albania should be active. Albania aspires to join the EU and when it is be part of the EU, it will have to voluntarily change status and behave like all countries and to incur obligations to reduce emissions of greenhouse gases," says the DW Mirela Kamberi.

Currently, more than fifty regions around the world are working to accelerate the development of photovoltaic. In recent years a true market of this technology has been built; in 2009 in Europe photovoltaic element has reached third place after wind and gas, in terms of new installed power in the period time of one year.

Regarding the use of RES, Albania has no database on which to place the analyzes and forecasts of the situation for the coming years. So structuring and construction of such data basis is a missing necessity for which is worked on this article.

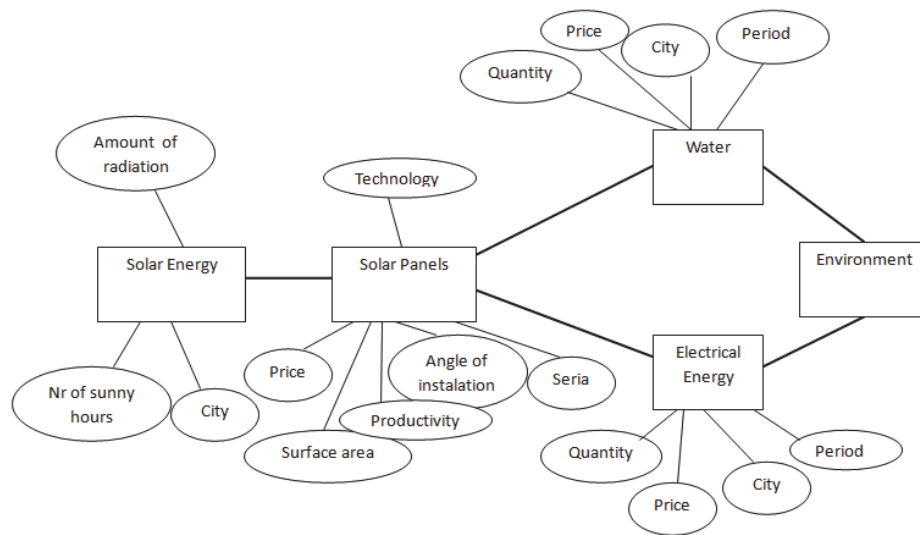
3. Our RDBMS Analysis and Design

The data are the foundation of information; information is the basis of knowledge, ie knowledge. A characteristic of knowledge is that knowledge of the "new" are the result of knowledge "old". The environment where the data is stored, should be carefully managed. Managing Data (Data of Management) is a discipline that focuses on the creation, preservation and delivery of data. DM is essential for any business or organization. A good design of DB, accuracy, data reliability and operational speeds are a priority.

Database are groups of files connected (that relate to each other), while:

- a. *File*: Sets record of the same type
- b. *Record*: Group of related fields (which are related to each other)
- c. *Field*: Group of characters as words or numbers, that
 - i. Describes an entity (person, place, thing in which we safeguard information)
 - ii. Attributes: Each characteristic, or quality that describes an entity

Our analysis is based over relational diagram presented at a previous step of my theses.

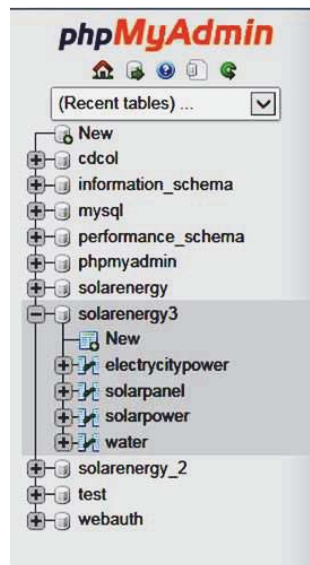


Each of the above entities has been converted into a table and each entity's attribute has been converted into a table column. The whole schema has been converted into solarenergy DB under which I have created tables of:

- solar power
- electricity power
- water
- solar panel

There are many popular RDBMS available to work with. MySQL is an open source SQL database which is supporting many different platforms including Microsoft Windows, Linux, UNIX, and Mac OS X.

MySQL has free and paid versions and comes with robust SQL database server. We're using XAMPP as Apache server because it is free and has a very user friendly GUI related to MySQL database server. It can be easily downloaded from the below link: <https://www.apachefriends.org/index.html> as our web server and below.



Or writing down SQL statement and run it over SQL editor.

/***** create a ne DB *****/create database SolarENERGY3;

After creating DB, we have creating all tables using SQL statement.

Let's now create a second table of solarpower ; which will have four columns spw_id, city_id, month and amount.

SPW_id is used as the primary key of the table and is needed to uniquely identify one record of the table. City_id is the ID used for the city which is city name indeed. Month as month of the year and defined as varchar datatype and the amount which stores values of the solarpower per each city based on the respective month of the year.

SPW_ID	CITY_ID	MONTH	AMOUNT
1			
2			
3			
4			
5			
6			

The data table will looks like: please see sheet SOLARPOWER on the attached excel file.

Create new table electrycitypower as per below SQL script. EP_ID is defined as its primary_key and integer as datatype and not allow NULL value.

EP_ID	PRICE	MONTH	CITY_ID	AMOUNT

The data table will looks like: please see sheet electrycitypower on the attached excel file.

Create new table water as per below SQL script. W_ID is defined as its primary_key and integer as datatype and not allow NULL value.

W_ID	PRICE	CITY_ID	AMOUNT

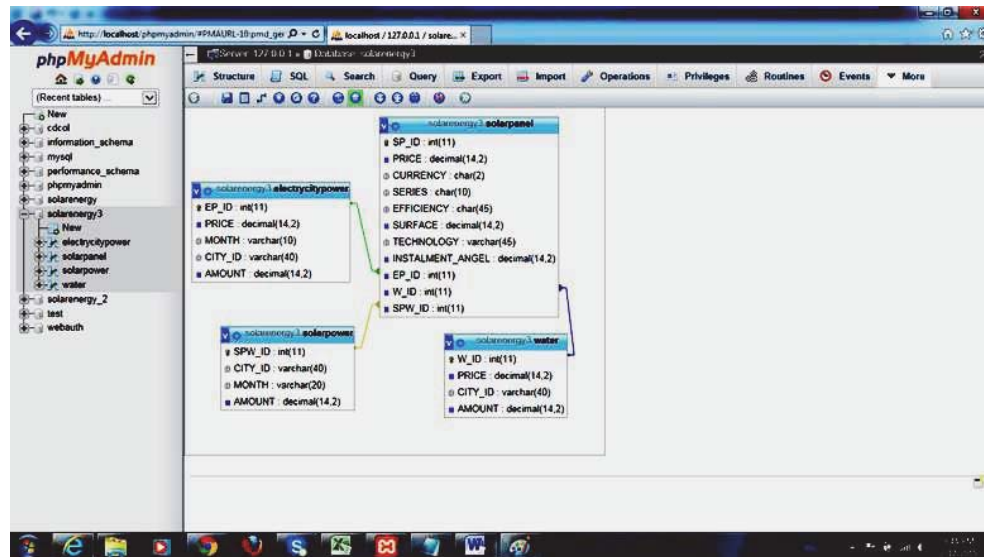
The data table will looks like: please see sheet water on the attached excel file.

Create new table solarpanel as per below SQL script. SP_ID is defined as its primary_key and integer as data type. There are 3 columns EP_ID, W_ID, OP_ID which are defined as foreign key in 3 different tables.

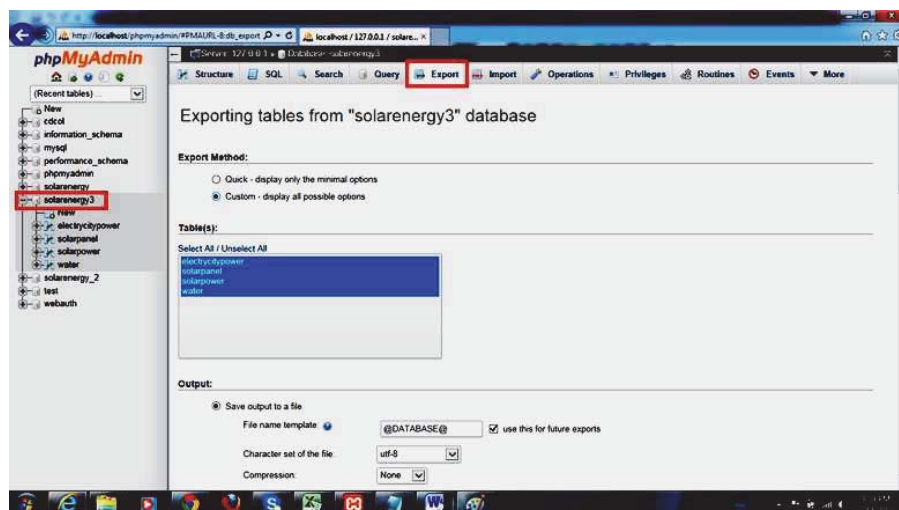
SP_ID	PRICE	CURRENCY	SERIES	EFFICIENCY	SURFACE	TECHNOLOGY	INSTALMENT_ANGEL	EP_ID	W_ID	SPW_ID

The data table will looks like: please see sheet SOLARPANEL on the attached excel file.

After creating all tables and link them with foreign_keys, XAMPP gives us support to design the relationship between tables as a visual view.



Another feature offered by XAMPP is import/export of DB tables as data and table structure as well.



A SQL file is created which can be imported to another location, the attached file can be open with WordPad in order to have a better and understandable view.

4. Conclusions

Usage of photo-elements in Albania brings considerable economic and ecological profits. The existing data are not structured and because of these also not usable for analyzing the current situation in Albania or making predictions for the future. Designing of the RDBMS and after it population with data helps also the businesses to evaluate the situation over competition but for more it is indispensable when the law for renewable energies will be applied in order to develop strategies in these area. Our future goal for these system is to automate it as soon as possible in order to have trusted predictions for all investors, being public or private ones. Another good issue to take care with will be to statistically highlight the ecological profits of these technology in the country.

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